

FIG.1A

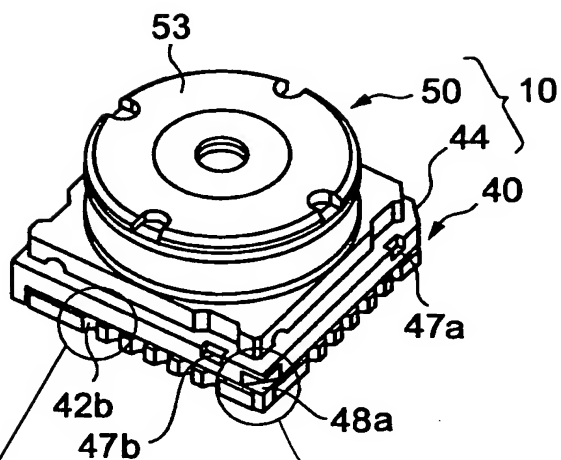


FIG.1B

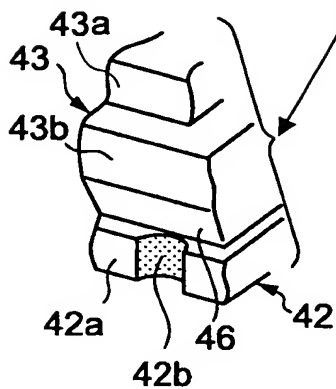


FIG.1C

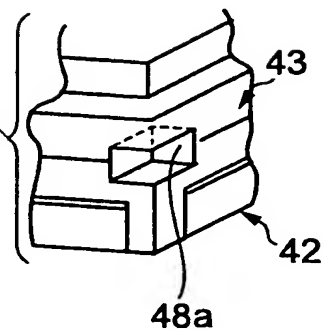


FIG.1D

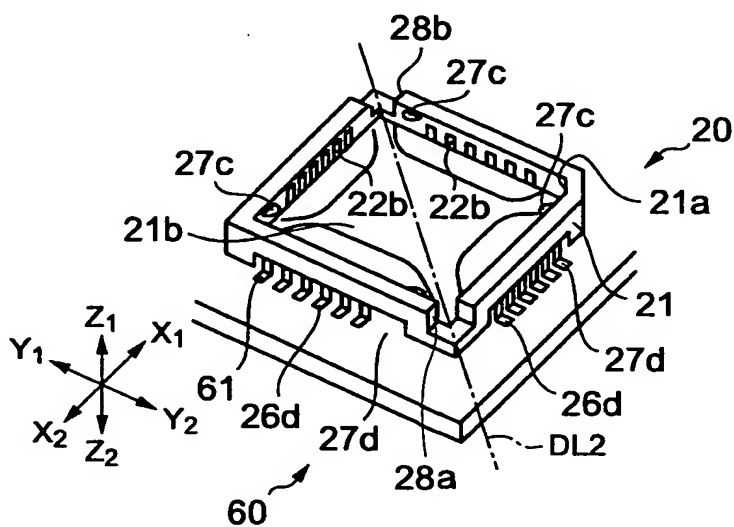


FIG.2A

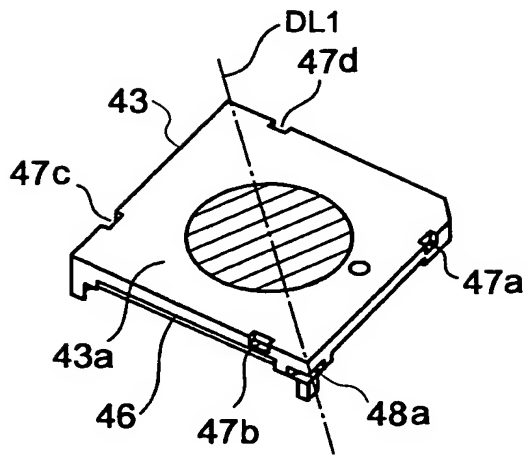


FIG.2B

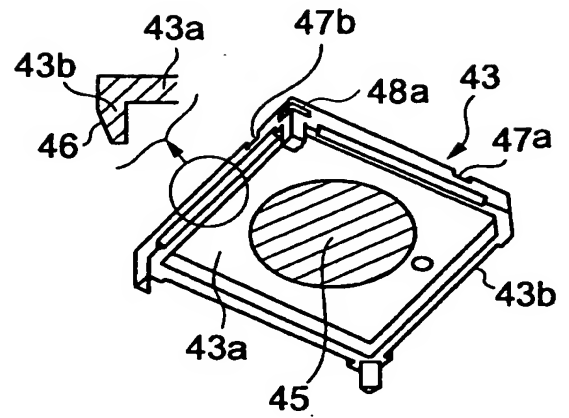


FIG.2C

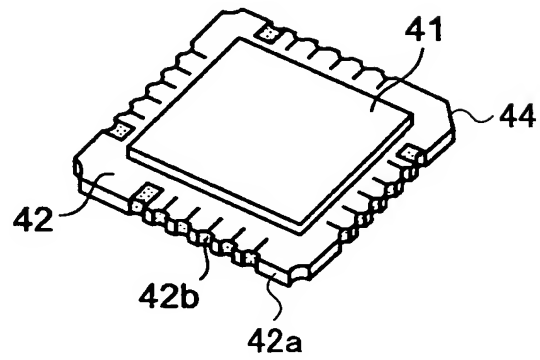


FIG. 1 is a top view of a square-shaped device 10. The device features a central circular region 47a, which is surrounded by a thick outer ring 47b and a thinner inner ring 47c. Four semi-circular protrusions 47d are positioned on the outer ring 47b. The device is enclosed within a square frame 20. The frame consists of four corners 21c and four sides 27c. The sides 27c are further divided into segments 28a and 28b. A coordinate system is shown at the bottom left with axes X1, X2, Y1, and Y2. Arrows A and B indicate directions.

A detailed cross-sectional view of a piezoelectric actuator assembly. The assembly includes a piezoelectric actuator (10) with a top electrode (50) and a bottom electrode (51). The actuator is sandwiched between a top insulating layer (53) and a bottom insulating layer (54). A central piezoelectric layer (52) is shown with a curved profile, indicating its expansion or contraction. The actuator is mounted on a base (40) which has a central opening (41) and a surrounding ring (42). The base is supported by a substrate (21b) which has a central opening (21a) and a surrounding ring (21c). The substrate is mounted on a base plate (60) which has a central opening (61) and a surrounding ring (62). The base plate is supported by a base (22) which has a central opening (22a) and a surrounding ring (22b). The base is mounted on a base plate (27) which has a central opening (27a) and a surrounding ring (27b). The base plate is supported by a base (27c) which has a central opening (27d) and a surrounding ring (27e). A coordinate system is shown in the bottom left corner with axes X_1 , X_2 , Z_1 , and Z_2 .

FIG.6A

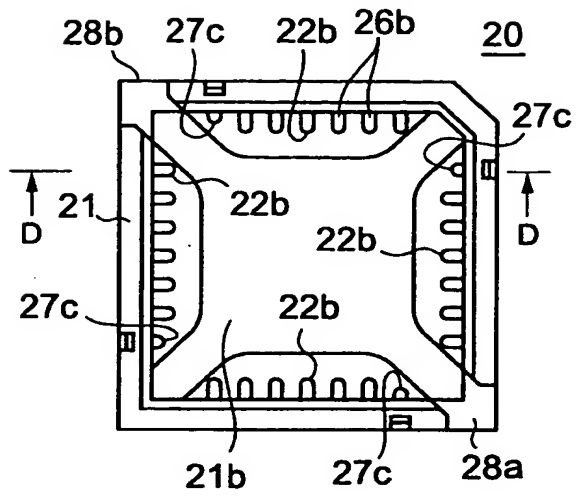


FIG.6C

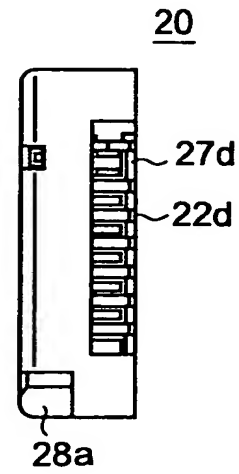


FIG.6B

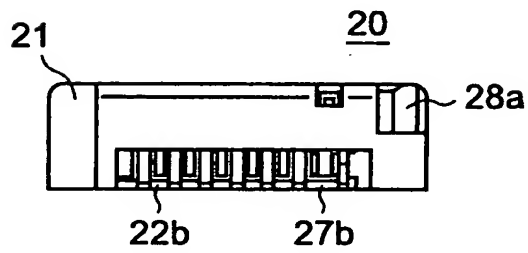


FIG.6D

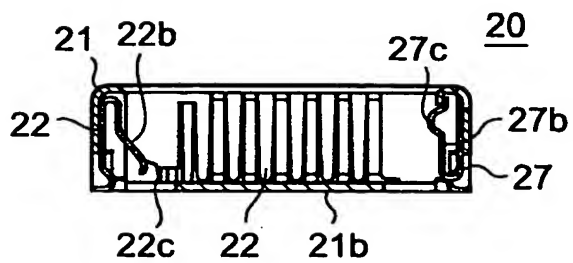


FIG.7A

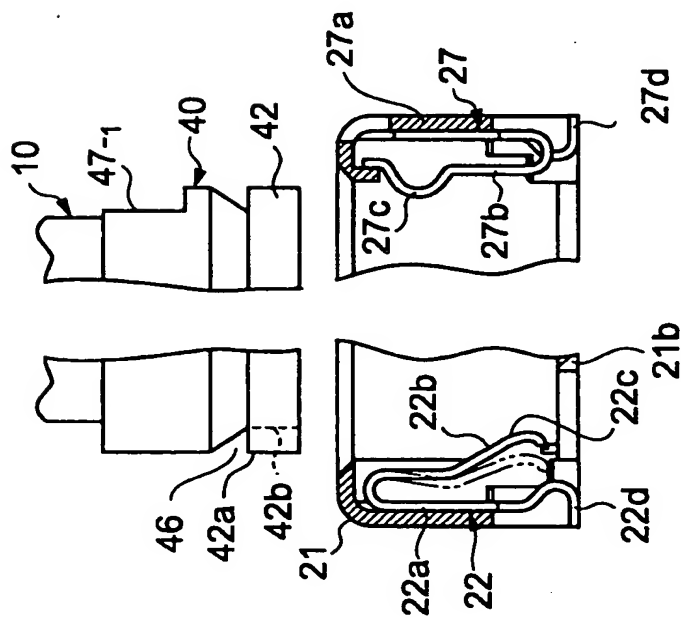


FIG.7B

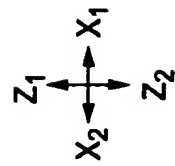
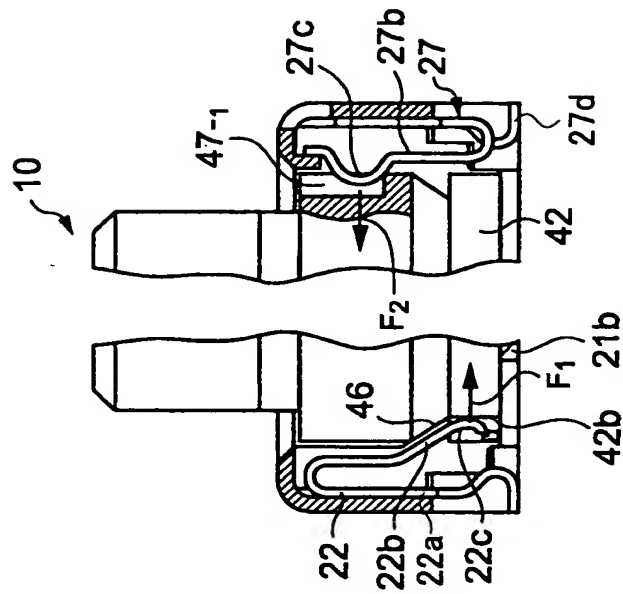


FIG.8

